

CLAIMS

1. A method of genetically transforming the somatic cells of an animal comprising the steps of:
  - coating copies of an exogenous genetic
  - 5 construction, the construction constructed so as to be able to express a gene product in the cells of the animal, onto carrier particles of dense material of a size very small in relation to the size of the animal cells;
  - 10 layering the coated carrier particles onto a planar carrier sheet;
  - placing the carrier sheet onto a spark discharge chamber;
  - placing a droplet of water between the ends
  - 15 of a pair of spaced electrodes so as to bridge the gap between the electrodes;
  - placing the animal cells in the direction of travel of the carrier sheet;
  - initiating a discharge of high voltage
  - 20 electricity between the electrodes so that a spark bridges the gap between the electrodes, vaporizing the water droplet and accelerating the carrier sheet toward the animal cells, the carrier sheet being restrained from hitting the animal cells but the carrier particles
  - 25 traveling into the animals cells, the force with which the carrier particle hit the animal cells being adjustable by adjusting the voltage of the high voltage electricity applied to the electrodes so that the exogenous genetic construction is introduced into the
  - 30 animal cells with minimal damage to the cells.

2. The method of Claim 1 wherein the exogenous genetic construction includes a protein coding DNA sequence and effective flanking regulatory sequences effective to express the protein in the animal cells.

3. The method of Claim 1 wherein the exogenous genetic construction is a DNA sequence effective to express a negative RNA strand in the animal cells to inhibit a native gene or to inhibit disease processes.

5 4. The method of Claim 1 wherein the animal cells are in culture out of the body of the animal.

10 5. The method of Claim 1 wherein the animal cells are in vivo in the living animal and wherein the entire live animal is placed in the direction of travel of the carrier sheet.

6. The method of Claim 5 wherein the animal cells that are transformed are in the skin of the animal.

15 7. The method of Claim 1 wherein there is a retaining screen placed between the spark discharge chamber and the animal cells to retain the carrier sheet after it is accelerated toward the animal cells.

20 8. The method of Claim 1 further comprising, before the step of initiating the discharge, the step of introducing helium gas into the area between the spark discharge chamber and the animal cells.

9. The method of Claim 1 wherein the carrier particles are 1-3 micron gold particles.

10. Somatic cells of non-human animals transformed by the method of Claim 1.

25 11. A non-human animal some of the somatic cells of which have been transformed by the method of Claim 1.

12. A method of introducing an exogenous biological material into the somatic cells of a living animal comprising the steps of

5 coating copies of the exogenous biological material onto particles of a dense material small in size relative to the size of the cells of the animal; placing the coated particles on an apparatus which is capable of accelerating the particles by means of the expansive force of a water droplet vaporized by  
10 the discharge of an electric potential through it; and initiating the flow of the electric discharge through the apparatus to accelerate the coated carrier particles at and into the cells of the animal.

13. A method as claimed in Claim 12 wherein the  
15 biological material is a genetic construction.

14. A method as claimed in Claim 13 wherein the genetic construction is DNA.

15. A method as claimed in Claim 13 wherein the genetic construction is RNA.

20 16. A non-human animal comprising cells containing particles of gold of a size small in relation to the size of the cells, and a chimeric genetic expression construction effective to cause expression of a gene product in those cells.

*W. J. A. 4*